GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Limnoperna fortunei***

Limnoperna fortunei 正體中文

System: Freshwater

Kingdom	Phylum	Class	Order	Family
Animalia	Mollusca	Bivalvia	Mytiloida	Mytilidae

Common name golden mussel (English), mejillón dorado (Spanish), mexilhão-dourado (Portuguese, Brazil)

Synonym
Limnoperna lacustris , (Morton, 1973)
Limnoperna siamensis
Limnoperna depressa , (Brandt & Temcharoen, 1971)
Limnoperna supoti , (Brandt, 1974)
Modiola lacustris
Volsella fortunei , Dunker, 1857

Similar species *Dreissena polymorpha, Mytella charruana*

Summary Limnoperna fortunei (or golden mussel) is an epifaunal mytilid, native to Chinese and south-eastern Asian rivers and creeks. It became established in Hong Kong in 1965, and in Japan and Taiwan in the 1990's. In 1991 it invaded America through the Plata Basin in South America. Limnoperna fortunei modifies the presence and abundance of native macroinvertebrate fauna. It causes great economic damage to water intakes and cooling systems of facilities.[Español]

view this species on IUCN Red List

Species Description
The shell is dark brown above the umbonal keel and a yellow brown below. The interior of the shell with the nacreous layer, is purple above and white below the keel. The umbones are nearly terminal and the dorsal ligamental margin is straight or slightly curved. The ventral margin of the shell is a variable feature within specimens. There are no hinge teeth and no byssal notch. Similar species include Mytella charruana (d'Orbigny, 1842) and Dreissena polymorpha (Pallas, 1771), the zebra mussel.

Lifecycle Stages
Trocophore is the first planktonic stage (hours). Several stages of free-swimming planktonic veliger (D-larvae about 7 days, between 80-146 um; veliconcha between 90-237 um and pediveliger or umbonate, more than 256 um). Then the larvae settle as plantigrade mussels, attach to substrate as juveniles. Maturity is reached at about 5.5mm in length. Golden mussels live about 3.2 years.

Uses
Introduction into South America was unintentional through the ballast waters of ocean-going vessels. No uses are known for this species in its native area. It has potential as a bioacumulator of xenobiotics and for water clarifying.

Habitat Description
Byssally Mussels (Mytilus) and some scallops (e.g., Pteria) are epifaunal, attaching themselves to a substrate by means of collagenous byssal threads) attached to hard substrata, both natural and man-made (plastics, glass, metal, etc). It is a freshwater species but tolerates salinity to 3 ppt. It inhabits temperate and subtropical climates. Specimens under permanent exposure do not survive more than 120 hours while those moistened daily survive up to 168 hours. Smaller mussels reach 100% mortality before larger ones.

Reproduction
Dioecious species, external fertilization, planktonic larvae for several weeks before settling and attaching to a hard substrate.

Nutrition
Filter feeding.

General Impacts
The introduction of the golden mussel produces a rapid change in benthic communities and threatens native biodiversity. Golden mussels settle in high numbers on native bivalves (Hyriidae and Mycetopodidae), causing suffocation and starvation, leading to death. Since its invasion of the Plata Basin, dense colonization of hard substrates has modified the presence and abundance of several species of native macroinvertebrates, homogenized the habitat and altered the diet of fish. One fish species (*Leporinus obtusidens* Valenciennes, 1846) has changed its diet to predate entirely on the golden mussel but is not a limiting factor for its dispersion. The golden mussel produces macrofouling in the water systems of facilities.

Management Info
Dr. Gustavo Darrigran, an expert from Argentina, states that stopping the spread of the golden mussel in the natural environment is impossible but it can be decelerated. Appropiate prevention methods can avoid its entrance into facilities. Several control methods are available to remove or kill mussels from fouled man-made subtrates, but these methods are not useful for control in the wild. Controls include mechanical removal, chemical methods, thermal, UV light, electric current, and antifouling paints.
\r\nPreventative measures: Identifying potential marine pests- a deductive approach applied to Australia (Hayes, K.R., et al., 2002) presents an inductive hazard assessment protocol that is simple, does not require large amounts of data, and is capable of grouping hazardous species in to high, medium and low priority. Hazard priority is determined by the invasion potential and impact potential of the species. Invasion potential is expressed as the weighted sum of all vessel movements between Australia and 'infected' bioregions around the world. Impact potential is expressed in terms of human health, economic and ecological impacts. These were estimated using a web-based questionnaire sent to world-wide experts on each species investigated.
\r\nThe results of this analysis suggest the following hazard groups for *Limnoperna fortunii*:
Relative to human impacts: Medium priority – low to medium impact potential and medium invasion potential.
Relative to ecological and economic impacts: Medium priority – medium to high impact potential and medium invasion potential.

Pathway
Introduced between continents in ballast water due to commercial trade.Introduced to other rivers by overland or aquatic transport on boat hulls and trailers. Introduced as boats are transported for sport fishing.

Principal source: Dr. G. Darrigran, Grupo de Investigación en Moluscos Invasores. La Plata, Argentina

Compiler: IUCN/SSC Invasive Species Specialist Group (ISSG)

Review:

Pubblication date: 2005-07-03

ALIEN RANGE

[8] ARGENTINA
[9] PARAGUAY
[3] BRAZIL
[8] URUGUAY

BIBLIOGRAPHY

8 references found for **Limnoperna fortunei**

Managment information

Centre for Environment, Fisheries & Aquaculture Science (CEFAS)., 2008. Decision support tools-Identifying potentially invasive non-native marine and freshwater species: fish, invertebrates, amphibians.

Summary: The electronic tool kits made available on the Cefas page for free download are Crown Copyright (2007-2008). As such, these are freeware and may be freely distributed provided this notice is retained. No warranty, expressed or implied, is made and users should satisfy themselves as to the applicability of the results in any given circumstance. Toolkits available include 1) FISK- Freshwater Fish Invasiveness Scoring Kit (English and Spanish language version); 2) MFISK- Marine Fish Invasiveness Scoring Kit; 3) MI-ISK- Marine invertebrate Invasiveness Scoring Kit; 4) FI-ISK- Freshwater Invertebrate Invasiveness Scoring Kit and AmphISK- Amphibian Invasiveness Scoring Kit. These tool kits were developed by Cefas, with new VisualBasic and computational programming by Lorenzo Vilizzi, David Cooper, Andy South and Gordon H. Copp, based on VisualBasic code in the original Weed Risk Assessment (WRA) tool kit of P.C. Pheloung, P.A. Williams & S.R. Halloy (1999).
The decision support tools are available from:
http://cefas.defra.gov.uk/our-science/ecosystems-and-biodiversity/non-native-species/decision-support-tools.aspx [Accessed 13 October 2011]

The guidance document is available from http://www.cefas.co.uk/media/118009/fisk_guide_v2.pdf [Accessed 13 January 2009].

Darrigan, G. 2000. Recommended steps to prevent or slow down the spread of the golden mussel in the Argentine litoral of the R�o de la Plata

Summary: A preliminary guide published online by the the Grupo de Investigaci�n en Moluscos Invasores, Facultad de Ciencias Naturales y Museo (UNLP), La Plata, Argentina.

Darrigan, G. and G. Pastorino. 2003. The golden mussel, *Limnoperna fortunei* (Dunker, 1857) (Bivalvia, Mytilidae), in the neotropical region: a 10 year story of invasion. Tentacle 11:8-9

Hayes, K., Sliwa, C., Migus, S., McEnnulty, F., Dunstan, P. 2005. National priority pests: Part II Ranking of Australian marine pests. An independent report undertaken for the Department of Environment and Heritage by CSIRO Marine Research.

Summary: This report is the final report of a two year study designed to identify and rank introduced marine species found within Australian waters (potential domestic target species) and those that are not found within Australian waters (potential international target species).
Available from: http://www.marine.csiro.au/crimp/reports/PriorityPestsFinalreport.pdf [Accessed 25 May 2005]

General information

Darrigan, G. 2000. Potential impact of filter-feeding invaders on temperate inland freshwater environments.

Summary: The rapid expansion of invasive bivalves distribution into inland waters of South America portends significant changes in these environments. *Limnoperna fortunei*, the golden mussel, is provoking a new economic/environmental impact in South American freshwaters - namely macrofouling. Before the invasion of the golden mussel, this impact was only recorded in the marine and estuarine environment of the Neotropical region. To date, *Corbicula fluminea*, or the Asiatic clam, does not present generalized cases of macrofouling in the Neotropical region, as is common in the Holarctic region. However, the first two specific cases of macrofouling caused by *C. fluminea* were recently detected, in heat interchangers of power stations in Brazil. The impact caused by invasive bivalves in the Neotropical region is not only an economic one. Among the problems related to the presence of the golden mussel, the rapid change in benthic communities, favoring the presence of Oligochaeta and Hirudinea as well as the displacement of native species of mollusks, are registered. Other examples are the settlement of the golden mussel on native bivalves, or the fact that since the introduction of this bivalve, two gastropods have become rare (before the introduction, these gastropods were common). In relation to native fish species, this bivalve is a new element in the diet, constituting the main food item. Key words: Argentina Corbicula fluminea, environmental impact, freshwater bivalves, invasions, Limnoperna fortunei, Neotropical region.

Darrigan, G. & Ezcurra de Drago, I. 2000. Invasion of *Limnoperna fortunei* (Dunker, 1857) (Bivalvia: Mytilidae) in America. Nautilus, 2: 69-74.

Summary: We traced the invasion and distribution of the Asian bivalve *Limnoperna fortunei* (Dunker, 1857) in the Americas and comment on the problems caused by this species since its arrival. In 1991 this bivalve was introduced into the Plata Basin (currently the only American continent drainage invaded by this species) through the R�o de la Plata. Towards the end of 1994 and during 1995 it spread throughout the Argentine coast of the R�o de la Plata and has been reported from the Uruguayan coast. In 1995 and 1996, it was first discovered in the R�o Paran�, first up to Santo Tom� (31�40�S - 60�45�W) and later up to Goya (29�10�S - 59�16�W). In November 1996, it was reported in Isla del Cerrito, where the R�o Paraguay joins the R�o Paran� (27�20�S - 58�43�W). In April, 1997, it was collected in R�o Paraguay in Asunci�n Harbor (25�17�21��S - 57�38�08��W) Paraguay; its northernmost location to date. In 1999, it was detected in Brazil (Praia Itapua, Municipio Viamao, Rio Grande do Sul). These recent records document its permanent expansion and adaptation to different environments of the basin. Key words: South America. Neotropical Region. The Plata Basin. Invasive species. Limnoperna fortunei. Distribution. Biofouling.

Darrigan, G. & Pastorino, G. 1995. The Recent Introduction of Asiatic Bivalve, *Limnoperna fortunei* (Mytilidae) into South America. The Veliger, 38(2):183-187. California, EEUU.
Summary: The temporal and spacial distribution of *Limnoperna fortunei* in the Argentine litoral of the R�o de la Plata is reported. Its distribution is limited by the most contaminated areas and by an increment in the salinity concentration. A decrease in density was recorded between August 1992 and january 1993. Subsequently there was an increase in density up to a maximum of 82,000 ind/m2 in May 1993. It is concluded that because of its functional and morphological characteristics, *L. fortunei* will spread quickly. With *C. fluminea* and *C. largillierti*, *L. fortunei* is the third invading species to be introduced into South America from Southeast Asia. Its possible entry to Argentina, by trading ships from Korea and Hong Kong, is suggested. Import peaks correspond with the arrival of these three invaders.
Morton, B. 1973. Some aspects of the biology and funcional morphology of the organs of feeding and digestion of *Limnoperna fortunei* (Dunker) (Bivalvia: Mytilacea). Malacologia 12(2): 265-281.